



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/625,267

07/23/2003

Michael C. Breslin

28810/04002

8405

24024

7590

05/16/2006

CALFEE HALTER & GRISWOLD, LLP
800 SUPERIOR AVENUE
SUITE 1400
CLEVELAND, OH 44114

EXAMINER

SAVAGE, JASON L

ART UNIT

PAPER NUMBER

1775

DATE MAILED: 05/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,267

Applicant(s)

BRESLIN ET AL.

Examiner

Jason L. Savage

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 24-37 and 42 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 47-49 is/are allowed.
- 6) ☒ Claim(s) 1-23, 43-46 is/are rejected.
- 7) ☒ Claim(s) 38-41 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 45 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitation that the preform is sufficiently free of interstitial cavities to promote formation of a composite material without travel of reactants through interstitial cavities is indefinite since it is unclear what applicant intends. For Examination purposes, the claim has been interpreted as meaning the preform has an essentially continuous ceramic portion.

Claim Rejections - 35 USC § 102/103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4, 8, 12-14, 16, 18, 20, 22-23, 43 and 45-46 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lesher et al. (US 4,921,818).

Lesher teaches a composite of a ceramic and metal comprising a silicon carbide having a silica film which is infiltrated with aluminum to form an oxidation reaction product (col. 4, ln. 12-42). The reaction product of the Lesher composite would be an alumina-aluminum binding phase just as that claimed by Applicant. Regarding the

Art Unit: 1775

limitation that the composite material has been substantially fully reacted with aluminum, Lesher teaches it is understood that all of the doping silica film may be utilized (col. 4, ln. 43-61).

Regarding the limitation that the composite material is made from a dense perform; Lesher teaches that the perform may have a porosity between 5 to 90% and preferably 25 to 75 % by volume (col. 8, ln. 29-33). As such, Lesher would anticipate the claim limitation since a porosity of 5 and 25% would equate to a density of 95 and 75% respectively, meeting the limitation that the preform is dense. In the alternative, it would have been obvious to have used a dense perform having a low porosity since Lesher teaches that such a perform is suitable for use.

Regarding claims 2, 12 and 14, the silicon carbide ceramic portion would meet the limitation of being a material that is substantially non-reactive with aluminum.

Regarding claim 4, Lesher teaches the particulate silicon carbide size may be 250 or 750 mesh (col. 7, ln. 21-36) and further teaches it may be between 10-1000 mesh (col. 8, ln. 1-10) which falls within the particle size range claimed by Applicant.

Regarding claim 8, Lesher teaches that the composite may comprise a continuous interconnected ceramic portion (col. 11, ln. 59-68).

Regarding claims 16, 18, 20 and 22, the claim limitations are drawn to an intended uses of the composite material. Lesher teaches that the composite is adaptable or fabricated for use as articles of commerce which includes industrial, structural and technical ceramic bodies for such applications where electrical, wear, thermal, structural, or other feature or properties are important or beneficial (col. 5, ln.

Art Unit: 1775

26-34). Furthermore, the composite of Lesher would be just as capable of having a surface that could be exposed to friction or wear and be just as capable of functioning as an electrical conductor, thermal management device and absorbing and dissipating kinetic energy from high velocity projectiles since the composite of Lesher has the same structure and materials as the composite claimed by Applicant.

Regarding claim 43, Lesher teaches that the perform preferably has a density of between 25-75 volume % (col. 8, ln. 29-33). A density of 75% anticipates the range claimed by Applicant of at least 75 volume %.

Regarding claim 45, Lesher teaches that the composite may comprise a continuous interconnected ceramic portion (col. 11, ln. 59-68).

Regarding claim 46, Lesher teaches that aluminum may be used at the infiltrant (col. 4, ln. 32-42). Regarding the limitation that the perform is substantially totally immersed in molten aluminum alloy, the claims are drawn to the article not the method of making. Absent a showing of a material distinction between the article of the present invention and that of the prior art, it would not provide a patentable distinction over the prior art.

Claims 1-14, 16, 18, 20, 22-23, 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Dhandapani et al. (Article – Growth and Microstructure of Al_2O_3 -SiC-Si(Al) Composites Prepared by Reactive Infiltration of Silicon Carbide Preforms).

Dhandapani teaches a composite of a ceramic and metal comprising a silicon carbide having a silica layer which is infiltrated with aluminum to form the composite

Art Unit: 1775

reacted product (p. 649, col. 2 last paragraph). Dhandapani teaches that the thus formed product contains a silicon carbide ceramic portion and an alumina-aluminum binding phase (p. 651 and p.652, Table 1). Regarding the limitation that the composite material has been substantially fully reacted with aluminum, since Dhandapani teaches that no silica is contained in the formed product (p. 652, Table 1), it would meet the limitation of being fully reacted with aluminum.

Regarding the limitation that the composite material is made from a dense preform; Dhandapani teaches that the preform may have a porosity of 33% (p. 652, col. 1, Second paragraph). As such, Dhandapani would anticipate the claim limitation since a porosity of 33% would equate to a density of 67% respectively, meeting the limitation that the preform is dense. In the alternative, it would have been obvious to have used a dense preform having a low porosity since Dhandapani teaches that such a preform is suitable for use.

Regarding claims 2, 12 and 14, Dhandapani teaches that no reaction occurs between the aluminum melt and ceramic material preform (p. 649, col. 2, first full paragraph).

Regarding claims 4-7 and 9-11, Dhandapani teaches the particulate silicon carbide size used was between 5-300 μm , the silicon carbide vol. % is 34-67%, 12-43 vol. % aluminum oxide and 2.5-21.2 vol. % aluminum and zero% silica (p. 652, Table 1).

Regarding claims 8 and 45, Dhandapani teaches that the composite may comprise a continuous interconnected ceramic portion (col. 11, ln. 59-68).

Art Unit: 1775

Regarding claims 16, 18, 20 and 22, the claim limitations are drawn to an intended uses of the composite material. The composite of Dhandapani would be just as capable of having a surface that could be exposed to friction or wear and be just as capable of functioning as an electrical conductor, thermal management device and absorbing and dissipating kinetic energy from high velocity projectiles since the composite of Dhandapani has the same structure and materials as the composite claimed by Applicant.

Regarding claim 46, Dhandapani teaches the composite is infiltrated with aluminum to form the composite reacted product (p. 649, col. 2 last paragraph). Regarding the limitation that the perform is substantially totally immersed in molten aluminum alloy, the claims are drawn to the article not the method of making. Absent a showing of a material distinction between the article of the present invention and that of the prior art, it would not provide a patentable distinction over the prior art.

Claim Rejections - 35 USC § 103

Claims 15, 17, 19, 21 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leshner et al. (US 4,921,818)

Regarding claims 15, 17, 19, 21; Applicant claims that composite is used in a wide variety of articles. While Leshner is silent to the use of the composite in such applications, it does teach that the composite is adaptable or fabricated for use as articles of commerce which includes industrial, structural and technical ceramic bodies for such applications where electrical, wear, thermal, structural, or other feature or

Art Unit: 1775

properties are important or beneficial (col. 5, ln. 26-34). It would have been within the purview of one of ordinary skill in the art to recognize what articles could make use of the composite of Lesher with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from using the claimed composite in the specifically claimed articles, it would not provide a patentable distinction over the composite of Lesher which is taught as being suitable for use in similar applications.

Regarding claim 44, although Lesher does not exemplify an embodiment wherein the density is at least 85 volume%, Lesher teaches that the perform may have a porosity of up to 95 % by volume (col. 8, ln. 29-33). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used a perform having a density of up to 95 volume % since Lesher teaches that a perform having such a density is suitable for use.

Claims 15, 17, 19, 21 and 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhandapani et al. (Article – Growth and Microstructure of Al_2O_3 -SiC-Si(Al) Composites Prepared by Reactive Infiltration of Silicon Carbide Preforms).

Regarding claims 15, 17, 19, 21 and 41, Applicant claims that composite is used in an wide variety of articles. While Dhandapani is silent to the use of the composite in such applications, it would have been within the purview of one of ordinary skill in the art to recognize what articles could make use of the composite of Dhandapani with a reasonable expectation of success. Absent a teaching of the criticality or showing of

Art Unit: 1775

unexpected results from using the claimed composite in the claimed articles, it would not provide a patentable distinction over the composite of Dhandapani.

Regarding claims 43-44, although Dhandapani does not exemplify embodiments wherein the density is at least 75 and 85 volume% respectively, it teaches that the use of inhibitor packing enables high density performs to be infiltrated without external growth (p. 656, col. 1, last paragraph). It would have been within the purview of one of ordinary skill in the art at the time of the invention to have recognized that alternate densities for the preform such as densities greater than the 67 volume % disclosed could be employed with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from the perform densities recited, it would not provide a patentable distinction over the prior art.

Allowable Subject Matter

Claims 47-49 are allowed

Claims 38-41 are objected to for being dependent upon a withdrawn claim but would be allowable if rewritten in independent form including all of the limitations of the intervening claims.

Response to Arguments

Applicant's arguments submitted on 2-23-06, however they are not persuasive for the reasons set forth below:

Applicant argues that Leshner does not anticipate the claims as amended with the newly added limitation that the perform is dense since Leshner discusses the importance of sufficient permeability. However, as was set forth in the rejection above, Leshner teaches densities which would fall within the preferred ranges claimed by Applicant in claims 43-44. As such, the assertion that Leshner does not teach a dense perform such as claimed is not persuasive.

Applicant also argues that Dhandapani does not teach a dense perform. However, as was set forth in the rejection above, Dhandapani teaches a density of 67% as well as teaching that the use of inhibitor packing enables high density performs to be infiltrated without external growth. As such, Applicant's argument with respect to Dhandapani not teaching a dense perform is also not persuasive.

Applicant further argues that Leshner and Dhandapani do not teach silica-bonded ceramic portions. However, Leshner teaches that the silicic compound is subjected to prefiring step to form an oxide coating in situ (col. 6, ln. 55-63). Dhandapani teaches that the silicon carbide containing perform is sintered which causes oxidation of the perform and inter-particle bonding (p. 650, col. 1, paragraph 1). As disclosed by Dhandapani, oxidizing silicon carbide performs results in bonding of the materials. As such, the performs of Leshner and Dhandapani, both of which are subjected to a firing step which oxidizes the perform is considered an bonded ceramic portion. Furthermore, since the oxidation of silicon carbide would result in the formation of silica, the performs would meet the claim limitation of being silica-bonded ceramic portions.

Regarding claims 15, 17, 19 and 21 which stand rejected under 35 U.S.C. in view of Lesher, Applicant argues that the Office Action fails to make a prima facie case of obviousness. As was set forth in the rejections above, Lesher teaches that the composite is adaptable or fabricated for use as articles of commerce which includes industrial, structural and technical ceramic bodies for such applications where electrical, wear, thermal, structural, or other feature or properties are important or beneficial (col. 5, ln. 26-34). It would have been within the purview of one of ordinary skill in the art to recognize what articles could make use of the composite of Lesher with a reasonable expectation of success. Absent a teaching of the criticality or showing of unexpected results from using the claimed composite in the specifically claimed articles, it would not provide a patentable distinction over the composite of Lesher which is taught as being suitable for use in similar applications.

Regarding claims 15, 17, 19, 21 and 38-41 which stand rejected under 35 U.S.C. in view of Dhandapani, Applicant argues that since claim 13 was asserted to be allowable, claims 15, 17, 19 and 21 which depend from 13 should be allowable. However, claim 13 is still rejected for the reasons set forth above, as such claims 15, 17, 19 and 21 remain rejected as well.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

Art Unit: 1775

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Savage whose telephone number is 571-272-1542. The examiner can normally be reached on M-F 6:30-4:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1775

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jason Savage
5-12-06



JENNIFER C. MCNEIL
SUPERVISORY PATENT EXAMINER
5/15/06